Space + Time + Brain: 4D Particle Detectors using Neuromorphic Computing

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Now

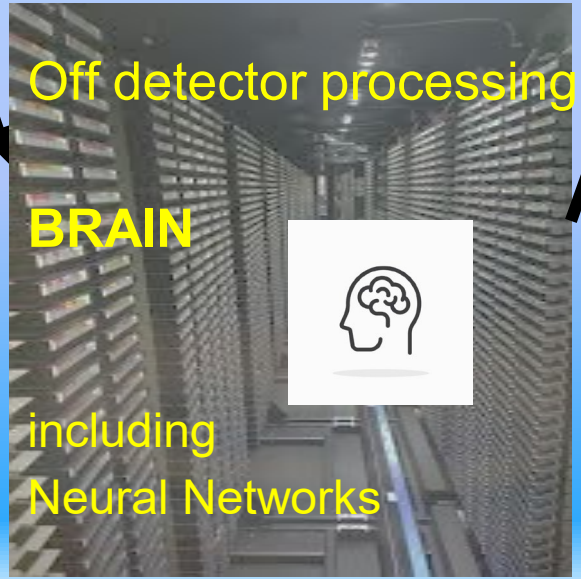
Detector in beam

Silicon trackers

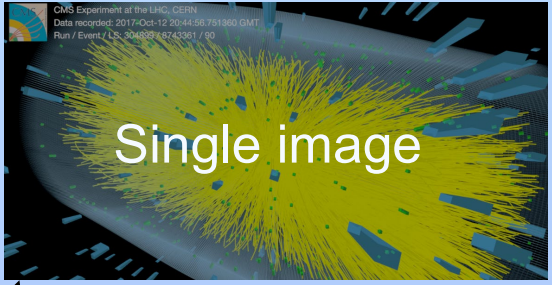
can be made with good

space + time resolution

Cluster information



Track+jet information

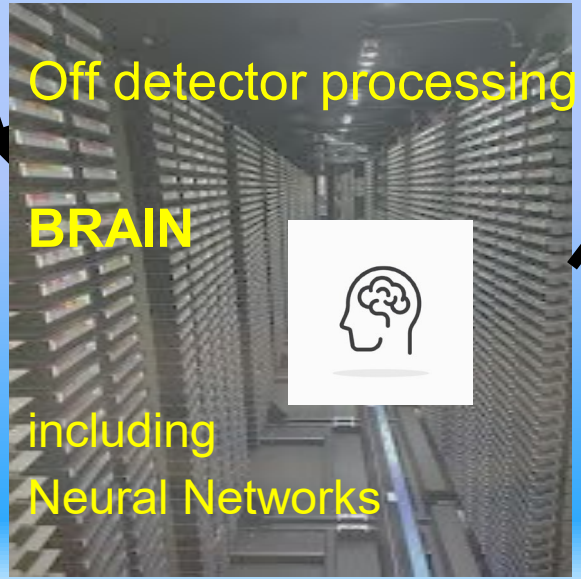


Goal: move BRAIN onto detector

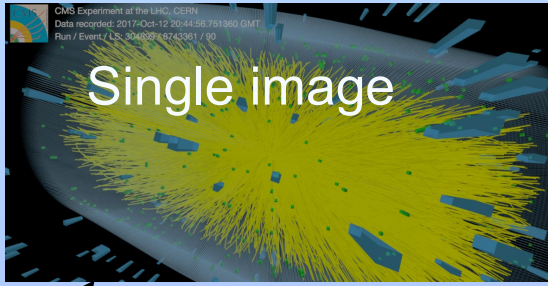
Detector in beam

Silicon trackers can be made with good space + time resolution

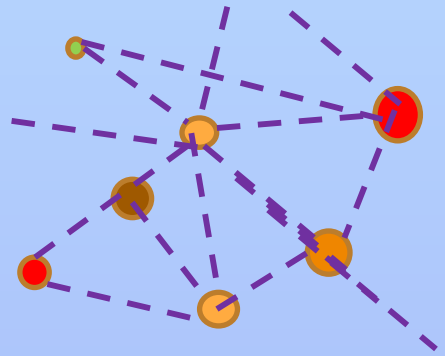
Cluster information



Track+jet information



Use Neuromorphic computing (NC)



Memory and computing elements aren't separated -
MEMRISTORS

Neurons communicate in parallel architecture

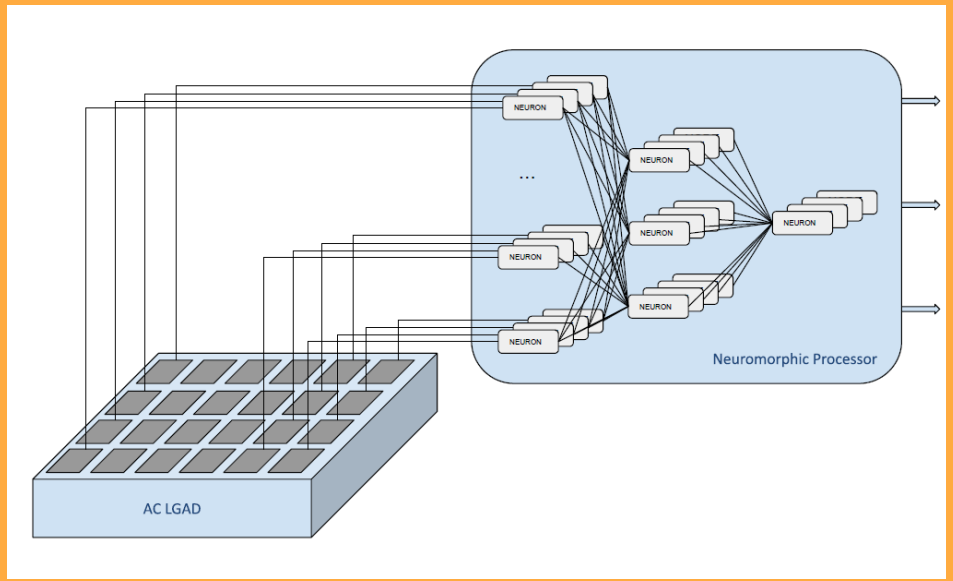
NC systems are being developed quickly:
we need to start using them with our detectors

Detector has

BRAIN

Attached with readout electronics

Example of Detector



Time sequenced jet and track information

Need new algorithms including Spiking Neural Networks

Future

Detector in beam

space + time + brain